

Comment Summary and Responses
 Comment Deadline: October 30, 2017
 Amendment to the Water Quality Control Plan for the Central Coastal Basin to Establish Total Maximum
 Daily Loads (TMDLs) for Sediment Toxicity and Pyrethroid Pesticides in Sediment in the Lower Salinas
 River Watershed, Monterey County California

List of Commenter's:

Comment Reference	Organization	Representative
1	United States Department of Interior Fish and Wildlife Service (USFWS)	Christopher J. Diel
2	Somach Simmons & Dunn on behalf of Pyrethroid Working Group (PWG)	Theresa (Tess) Dunham

Response to Comments:

No.	Author	Comment	Response
1.1	Mr. Diel USFWS	<p>We have reviewed the Basin Plan Amendment and Technical Project Report associated with the proposed Total Maximum Daily Loads (TMDLs) for sediment toxicity and pyrethroid pesticides in sediment in the lower Salinas River watershed in Monterey County, California. The lower Salinas River watershed supports habitat for the federally endangered tidewater goby (<i>Eucyclogobius newberryi</i>), and federally threatened California red-legged frog (<i>Rana draytonii</i>), as well as designated critical habitat for the tidewater goby. The U.S. Fish and Wildlife Service (Service) supports the State Water Resource Control Board's proposed approval of the amendment to the Water Quality Control Plan for the Central Coast Basin to establish these TMDLs.</p> <p>The mission of the Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. To assist in meeting this mandate, the Service provides comments on public notices issued for projects that may have an effect on those resources, especially federally-listed plants and wildlife. The Service's responsibilities also include administering the Endangered Species Act of 1973, as amended (Act). Section 9 of</p>	<p>Staff Response: Staff acknowledges Mr. Diel's support for State Water Resources Control Board's (State Water Board) proposed approval of the <u>TMDLs for Sediment Toxicity and Pyrethroids in Sediment in the Lower Salinas River Watershed</u> (Lower Salinas TMDL).</p> <p>Staff recognizes the important mission of USFWS to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. The mission is consistent with the goals of the State and Regional Water Quality Control Boards and Clean Water Act requirements to develop and implement TMDLs. Mr. Diel notes that the lower Salinas River watershed supports habitat for the federally endangered tidewater goby and the federally threatened California red-legged frog.</p>

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		the Act prohibits the taking of any federally listed endangered or threatened wildlife species. "Take" is defined at Section 3(19) of the Act to mean "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The Act provides for civil and criminal penalties for the unlawful taking of listed wildlife species. Such taking may be authorized by the Service in two ways: through interagency consultation for projects with Federal involvement pursuant to section 7, or through the issuance of an incidental take permit under section 10(a)(1)(B) of the Act.	
1.2	Mr. Diel USFWS	<p>The tidewater goby is endemic to California and typically inhabits coastal lagoons, estuaries, and marshes. These small fish feed on aquatic invertebrates, including mysids, amphipods, ostracods, snails, aquatic insect larvae, and particularly chironomid larvae. During breeding, male tidewater gobies dig burrows in estuarine sediment and then females aggressively spar with each other for access to males with burrows for laying their eggs. Male tidewater gobies remain in the burrow to guard the eggs that are attached to sand grains in the burrow ceiling and walls, and may remain in the burrow for approximately 9 to 11 days until the eggs hatch (Swenson 1999). These feeding and breeding characteristics put the gobies in frequent and prolonged contact with sediment, making them particularly vulnerable to hydrophobic contaminants, such as pyrethroid pesticides.</p> <p>The California red-legged frog uses a variety of habitat types, including various aquatic systems, riparian, and upland habitats. The diet of California red-legged frogs is highly variable. Larvae likely eat algae, while invertebrates are the most common food items of adult frogs. During breeding, female California red-legged frogs deposit egg masses on emergent vegetation, which generally hatch in 6 to 14 days, and larvae undergo metamorphosis 3.5 to 7 months after</p>	Staff Response: In this comment, Mr. Diel describes the connection between sediment toxicity and critical aquatic habitat for the tidewater goby and the California red-legged frog. The Lower Salinas TMDLs are set to protect the aquatic invertebrates that are food for small fish such as tidewater goby, as well as the California red-legged frog.

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		<p>hatching. The dependence on aquatic habitat for early developmental stages poses an exposure risk to California red-legged frogs from aqueous and sediment-bound pyrethroids.</p> <p>The Service is concerned that pyrethroid pesticides in the water and sediment of the lower Salinas River watershed may pose a risk to tidewater gobies and California red-legged frog, as well as many other aquatic species. We are particularly concerned about the potential for sediment pyrethroid concentrations to continually increase in estuary sediments, where tidewater goby reproduce. The technical report associated with the proposed TMDLs indicates sediment toxicity to aquatic invertebrates was demonstrated in several waterways of the lower Salinas River watershed. Tidewater gobies and California red-legged frogs feed on aquatic invertebrates, therefore there is a direct connection between the sediment toxicity and an adverse effect to tidewater gobies through a depressed food base.</p>	
1.3	Mr. Diel USFWS	<p>Pyrethroids may also have a direct toxic effect to tidewater gobies, but we are not aware of any sediment toxicity data currently available in open literature that have explored these effects. The U.S. Fish and Wildlife Service has assisted in the investigation of two fish kill events in Ventura County in 2015 and 2016 that were ultimately linked with pyrethroid toxicity (CDFW 2015, 5. McMillin, pers. comm. 2016). Both fish kills occurred within the lower portions of coastal watersheds, within tidewater goby habitat and affected thousands of fish. Because tidewater goby are small and cryptic, and because they do not have swim bladders they do not float when dead and would be difficult to detect during a fish kill event. A mesocosm study by Drenner et al. (1992) demonstrated that sediment-bound bifenthrin was biologically available and caused mortality and sub-lethal toxicity to the gizzard shad (<i>Dorosoma cepedianum</i>), a filter feeder with similar sediment exposure as the tidewater goby. It is therefore</p>	<p>Staff Response: Mr. Diel states that pyrethroids may have direct toxic effects on tidewater gobies. As noted in the study cited by Mr. Diel, sediment-bound bifenthrin (as opposed to freely dissolved) was biologically available and caused mortality to a filter feeder, gizzard shad, which is a species similar to the tidewater goby. Pyrethroids strongly adsorb to detritus and suspended organic matter, which are food sources for fish such as gizzard shad and tidewater gobies as well aquatic invertebrates such as copepods and cladocerans.</p> <p>Staff supports Mr. Diel's request for additional research on the risk of pyrethroids to a broad group of species.</p>

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		reasonable to assume that sediment-bound pyrethroids may similarly cause direct toxicity to tidewater gobies. The Service is interested in conducting bioassays to determine sediment-bound pyrethroid toxicity to tidewater gobies. This crucial missing information would greatly benefit our understanding of the risk of pyrethroids to this wide-ranged species.	
1.4	Mr. Diel USFWS	In the absence of specific information relative to the toxicity of sediment-bound pyrethroids to tidewater gobies and California red-legged frogs, we strongly support the approach outlined in the Basin Plan Amendment. We are particularly supportive of the sediment toxicity numeric target focusing on <i>Hyalella azteca</i> 10-day chronic exposures as an appropriate metric to determine whether the sediment toxicity target is being met. We are also supportive of the numeric targets for pyrethroids in water and sediment as appropriate thresholds based on the best data currently available. As pyrethroids are relatively stable in sediment, concentrations may continue to rise in the absence of TMDL implementation, potentially leading to continued degradation of habitats for listed species and the possibility of catastrophic events similar to the fish kills observed in Ventura County. We urge the State Water Resources Control Board to adopt the proposed Basin Plan Amendment and implement the TMDLs as a positive step towards improving sediment quality in the lower Salinas River watershed.	Staff Response: Staff acknowledges Mr. Diel's support for the <i>Hyalella azteca</i> 10-day chronic exposure toxicity test as a numeric target and support for the pyrethroid water and sediment targets in the Lower Salinas TMDL.
2.1	Ms. Dunham on behalf of the PWG	Introduction Our firm represents the Pyrethroid Working Group (the PWG) in matters related to the <i>Amendment to the Water Quality Control Plan for the Central Coast Basin to Establish Total Maximum Daily Loads for Sediment Toxicity and Pyrethroids in Sediment in the Lower Salinas River Watershed</i> (Lower Salinas TMDL). On behalf of the PWG, we provide comments in response to your Notice of Opportunity to Comment.	Staff Response: Staff acknowledges that Ms. Dunham is submitting comments on behalf of the PWG. The PWG is an alliance of individual companies that manufacture pyrethroids.

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2.2	Ms. Dunham on behalf of the PWG	As a preliminary matter, the comments provided here meet the requirements of the California Code of Regulations, title 23, section 3779, subdivision (f), as directed in the State Water Resources Control Board's (State Water Board) Note of Opportunity to Comment. Specifically, our comments pertain directly to the final version of the Lower Salinas TMDL as adopted by the Central Coast Regional Water Quality Control Board (Central Coast Water Board) on July 14, 2017. The PWG actively participated in the Central Coast Water Board's administrative process and provided written comments at available opportunities. Further, we provided oral comments before the Central Coast Water Board at its July 14, 2017 meeting the directly relate to the comments provided herein.	Staff Response: Staff acknowledges the participation by Ms. Dunham in the stakeholder process for the Lower Salinas TMDL.
2.3	Ms. Dunham on behalf of the PWG	Concurrent with the development and submittal of these comments on the Lower Salinas TMDL, the PWG has also prepared and submitted comments on the Central Valley Water Quality Control Board's (Central Valley Water Board) <i>Amendments to the Water Quality Control Plan for the Sacramento and San Joaquin River Basins for the Control of Pyrethroid Pesticides Discharges</i> (Central Valley Pyrethroid Amendment). Many (if not all) of our comments on the Central Valley Pyrethroid Amendment are also applicable to the Lower Salinas TMDL. Accordingly, we hereby incorporate by reference our comments on the Central Valley Pyrethroid Amendment here.	Staff Response: The Central Valley Water Board adopted their pyrethroid Basin Plan amendment on June 8, 2017. Comments to the Central Valley Water Board Basin Plan amendment can be found on the program website and on the State Water Board adoption public comment website . The State Water Board public comment period closed on November 2, 2017.
2.4	Ms. Dunham on behalf of the PWG	In general, the PWG submits this letter to call out the differences between the Central Coast Water Board and Central Valley Water Board, and their use of certain water quality criteria for six (6) pyrethroid pesticides developed by the University of California Davis (UCD). We believe that the differences between how these criteria are being used by these two regional boards is critical in that the Central Valley Water Board (the entity responsible for development of the criteria) determined that additional information is necessary before these criteria could be adopted as water quality objectives, while on the other hand the Central Coast	Staff Response: The Central Valley Water Board and the Central Coast Water Board did not use the criteria developed by UC Davis in an identical way, however both approaches are scientifically valid and appropriate for their respective projects. The two regions tracked and discussed each other's approaches throughout the process and while there are some differences in the specific details of the approaches, both regions considered the characteristics of their respective region

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		<p>Water Board finds it appropriate to use the UCD criteria to interpret existing narrative toxicity objectives. In light of existing data and information, and considering the Central Valley Water Board's role in creating the criteria, we find the Central Valley Water Board approach to be more reasonable.</p>	<p>and interpreted narrative water quality objectives to meet water quality standards. The overall goals of each project were the same, to control pyrethroid discharges, to attain water quality standards, and to protect aquatic life.</p> <p>Neither region adopted the UC Davis criteria as water quality objectives. However, both regions use the UC Davis criteria to interpret existing narrative water quality objectives. The Central Valley Water Board utilized UC Davis criteria in developing prohibition triggers and numeric TMDL targets. These numeric TMDL targets are interpretations of existing narrative objectives.</p> <p>The Central Coast Water Board used UC Davis criteria as TMDL targets in both the Lower Salinas TMDL and the similar <u>TMDLs for Toxicity and Pesticides in the Santa Maria River Watershed</u> (Santa Maria TMDL).</p> <p>The two regions ending up with some differences and some similarities in their projects is consistent with State Water Board's Water Quality Control Policy for Addressing Impaired Waters (Resolution 2005-0050) that states "Regional Boards have wide latitude, numerous options, and some legal constraints that apply when determining how to address impaired waters."</p>
2.5	Ms. Dunham on behalf of the PWG	<p>Accordingly, the PWG requests that the State Water Board send the Lower Salinas TMDL back to the Central Coast Water Board with specific direction to require that the Central Coast Water Board reevaluate its use of the UCD criteria as is proposed in the Lower Salinas TMDL, and to consider developing an approach that is consistent with that</p>	<p>Staff Response: As noted in staff's response to comment 2.4, there are some differences and similarities in the approaches taken by the Central Coast Water Board and the Central Valley Water Board, as appropriate considering the factors involved. The Central Coast Water Board considered taking the same</p>

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		<p>as developed by the Central Valley Water Board.</p>	<p>approach with the UC Davis criteria as the Central Valley Water Board and determined that the approach used in the Lower Salinas TMDL was the most appropriate for our region. The two regions have some differences in approach because:</p> <ul style="list-style-type: none"> • The Central Valley Water Board and Central Coast Water Board project scopes and geographic scales differ significantly. The Lower Salinas TMDL project area covers 250,000 acres in one watershed with a well-known and studied pyrethroid impairment. In contrast, the Central Valley Water Board's project covers 27.6 million acres in several watersheds and includes provisions to resolve current impairments as well as potential future impairments. • The sources of pyrethroids are different in the two regions. The Central Coast Water Board's sources are agricultural and municipal stormwater only, while Central Valley Water Board sources also include publically owned treatment works (POTWs). • The agricultural requirements are crafted to work with each region's different Irrigated Lands Regulatory Programs, which were, in turn, crafted for the region's different agricultural practices and commodities. The Lower Salinas TMDL will be implemented through the current Agricultural Order and future updates. The Central Valley Water Board control program will be implemented through the development and implementation of management plans under their Irrigated Lands Regulatory Program. • The Lower Salinas TMDL needs to be consistent with other TMDLs in our region that have been
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			<p>approved and upheld in court.</p> <p>Additionally, see staff response to comment number 2.8.</p>
2.6	Ms. Dunham on behalf of the PWG	<p>I. Background:</p> <p>To better understand the differences between the Central Coast Water Board and Central Valley Water Board actions, it is important to first summarize some of the historical background as it relates to the development of pyrethroid pesticide criteria by UCD. This process started more than ten (10) years ago when the Central Valley Water Board entered into a contract with UCD for the development of a methodology for developing pesticide criteria. Under this contract, UCD developed the <i>Methodology for Derivation of Pesticide Water Quality Criteria for the Protection of Aquatic Life in the Sacramento and San Joaquin River Basins</i> (2009) (UCD Methodology). When it released this methodology, Central Valley Water Board staff issued the following statement:</p> <p style="padding-left: 40px;">Although the development of the UCD Methodology was funded by the Regional Water Board, the UCD Methodology has not been adopted or endorsed by the Regional Water Board. Therefore criteria developed using the UCD methodology should not be viewed as being inherently more appropriate than other available criteria. Further, criteria developed using the UCD Methodology should not be considered adopted water quality objectives, unless and until the Regional Water Board adopts, and the State Water Board and U.S. EPA approve the criteria as water quality objectives pursuant to all applicable statutory requirements.</p> <p>The statement further noted that "Regional Water Board staff intend for pesticide criteria developed using the UCD Methodology to be among criteria considered for adoption as</p>	<p>Staff Response: Staff acknowledges the background information provided by Ms. Dunham on the UC Davis criteria derivation methodology and the statement issued by the Central Valley Water Board on differences between criteria development and adoption of water quality objectives.</p> <p>As noted in response to comment 2.4, neither region adopted the UC Davis criteria as water quality objectives. The Central Coast Water Board used the UC Davis criteria to set targets that interpret narrative water quality objectives (see response to comment 2.14). This is not the same as adopting water quality objectives.</p>

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		<p>water quality objectives. The UCD Methodology was developed to derive criteria that are protective of aquatic life, but several additional considerations must be evaluated before pesticide water quality objectives can be adopted." In other words, the UCD Methodology, and pesticide criteria developed from the methodology, should be subject to further scrutiny and consideration prior to being used as water quality objectives, and by extension, before being used to interpret a water quality objective.</p> <p>Following development of the methodology, UCD then developed criteria for certain pesticides, including six (6) pyrethroids, through this contract. Relevant here, criteria for five pyrethroid pesticides were developed by UCD in 2010 and one (1) in 2014. At all times during the development of the criteria, and consistent with the statement made when the UCD Methodology was released, the Central Valley Water Board made it clear that the UCD criteria were not water quality objectives.</p> <p>In parallel with development of the UCD criteria, Central Valley Water Board staff held and facilitated open stakeholder meetings to discuss the criteria and the Central Valley Water Board's potential future amendments to the Water Quality Control Plan for the Sacramento-San Joaquin River Basins.</p>	
2.7	Ms. Dunham on behalf of the PWG	<p>In 2015, due to the availability of additional data and information for the pyrethroid pesticides, the Central Valley Water Board staff reviewed and updated the UCD 2010 (and 2014) criteria. As such updates occurred, the Central Valley Water Board continued to hold stakeholder meetings periodically to discuss the status of Basin Plan amendment</p>	<p>Staff Response: In this comment, Ms. Dunham provides background information on the development of the pyrethroid water quality criteria by the Central Valley Water Board and presents findings from the Central Valley Pyrethroid Basin Plan amendment.</p>

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		<p>development and to obtain input from all stakeholders with respect to the substance of proposed amendments. The culmination of the Central Valley Water Board's work and its stakeholder process for addressing pyrethroid pesticides is represented in the Central Valley Water Board's Pyrethroid Amendments. Through this lengthy process, which included peer reviews along the way, the Central Valley Water Board made several important findings, which are contained within the Central Valley Pyrethroid Amendment. These significant findings are as follows:</p> <ul style="list-style-type: none"> • There is insufficient information available to adopt water quality objectives for pyrethroid pesticides at this time; • It is appropriate to set a "trigger" value in the Basin Plan that then "triggers" development and implementation of management plans and practices rather than water quality objectives; • It is appropriate to use freely dissolved (i.e., bioavailable) concentrations of pyrethroids in the water column to determine whether trigger values have been exceeded; and, • The program of implementation should extend for 20 years. <p>The Central Valley Water Board adopted the Central Valley Pyrethroid Amendment on June 8, 2017.</p>	
2.8	Ms. Dunham on behalf of the PWG	<p>For the Central Coast Water Board, their development of the Lower Salinas TMDL is based almost exclusively on what they adopted for the Santa Maria River TMDL in 2014. As a reminder, when the State Water Board approved the Santa Maria River TMDL, the State Water Board specifically directed the Central Coast Water Board to consider the Central Valley Water Board's process. "Expects the Central Coast Water Board to follow the evolving regulation of</p>	<p>Staff Response: The Central Coast Water Board is following State Water Board's direction to track and engage in pyrethroid regulation in the Central Valley region, conduct additional stakeholder processes, and consider revisions to the approach used in the Santa Maria TMDL.</p>

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		<p>pyrethroids in the Central Valley region, engage as appropriate in that process, conduct further stakeholder process locally within the Central Coast region and to consider revisions consistent with whereas 8." (State Board Resolution 2014-0033, <i>Approving an Amendment to the Water Quality Control Plan for the Central Coast Basin to adopt Total Maximum Daily Loads for toxicity and pesticides in the Santa Maria River Watershed.</i>)</p> <p>After conducting a typical public review process, the Central Coast Water Board adopted the Lower Salinas TMDL on July 14, 2017. This was more than a year after the close of the Central Coast Water Board's written public comment period (March 7, 2016). At the July 2017 hearing, brief mention was made of the Central Valley Water Board's action that occurred on June 8, 2017. The PWG presented oral comments in response to this brief mention. However, considering the lack of time and consideration given to the Central Valley Water Board's actions by the Central Coast Water Board, and the lack of opportunity for written public comment after Central Valley Water Board action but prior to Central Coast Water Board action, it appears that the Central Coast Water Board acted contrary to the express direction given to them by the State Water Board, which was to give meaningful consideration to the Central Valley region's evolving regulation of pyrethroids.</p>	<p>As noted here by Ms. Dunham, the State Water Board resolution for the Santa Maria TMDL states the following:</p> <p><i>"Expects the Central Coast Water Board to follow the evolving regulation of pyrethroids in the Central Valley region, engage as appropriate in that process, conduct further stakeholder process locally within the Central Coast region and to consider revisions consistent with whereas 8."</i></p> <p>Additionally, whereas 8 of the State Water Board resolution states:</p> <p><i>"The Executive Officer of the Central Coast Water Board may propose approval of revised TMDL numeric targets, consistent with requirements necessary for such an approval, if the Executive Officer determines that the revised TMDL numeric targets are more appropriate than those approved in this resolution."</i></p> <p>Staff have been following the evolution of pyrethroid regulations throughout the Central Valley Water Board's process to determine if revisions to the Santa Maria TMDL's pyrethroid numeric targets are appropriate. For more than 6 years, Central Coast Water Board staff and Central Valley Water Board staff have been in close communication regarding the development of pyrethroid regulations.</p> <p>Prior to adoption of the Lower Salinas TMDL, Central Coast Water Board staff briefed the Executive Officer on the Central Valley Water Board's pyrethroid regulations. Staff determined that revising the Santa Maria TMDL pyrethroid numeric targets based on the Central Valley</p>
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			<p>Water Board criteria was not appropriate for our region at this time. Staff considered several factors in making this determination:</p> <ul style="list-style-type: none"> • The Santa Maria TMDL targets for pyrethroids in the water column have been fully adopted (Regional Board, State Water Board, U.S. EPA, and Office of Administrative Law). Utilizing the same targets in the Salinas TMDL promotes consistency in addressing pyrethroid impairments within the central coast region. • The UC Davis pyrethroid criteria used by the Central Coast Water Board was included in a petition of the Santa Maria TMDLs by the PWG. The courts denied the petition, which further supported the criteria's use. • The UC Davis criteria used by the Central Coast Water Board have also been used in a pyrethroid TMDL developed by U.S. EPA and are used for the 303(d) List pyrethroid impairment assessments in multiple regions, including the assessments done by the Central Valley Water Board for the 2014 Integrated Report (CRWQCB-CVR, 2017). • Both the Santa Maria and lower Salinas River watersheds have serious and widespread sediment toxicity problems associated with pyrethroids. Current levels are much greater than the targets proposed in the associated TMDLs. <p>Although the above noted State Water Board direction applies specifically towards revising the Santa Maria TMDLs, the work by the Central Valley Water Board was given consideration during development of the Salinas pyrethroid TMDLs and was discussed and</p>
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			<p>considered by the Central Coast Water Board at the Salinas River TMDL hearing. However, for the reasons stated above it was decided to move forward with the development of the pyrethroid TMDLs for the lower Salinas River watershed. The Central Coast Water Board will continue to track progress of the Central Valley Water Board pyrethroid regulations.</p> <p>Additionally, see staff response to comment number 2.5.</p>
2.9	Ms. Dunham on behalf of the PWG	<p>II. UCD Criteria Are Overly Conservative</p> <p>As an initial point, it is important to recognize the overly conservative nature of the UCD criteria as developed in 2010, and as they were updated by the Central Valley Water Board in 2015. The UCD Methodology recommends the use of the statistically-derived 5th percentile of the species sensitivity distribution (SSD), unless a more sensitive species falls below that value, at which point the 1st percentile is recommended. The 2010 UCD criteria are set at the 5th percentile level and the updated 2015 criteria are set at the 1st percentile level.</p>	<p>Staff Response: Staff reviewed the specific concerns noted by the Pyrethroid Working Group and does not find the criteria to be overly conservative. The factors applied in the UC Davis criteria are necessary to assure that water quality standards are achieved.</p> <p>The last sentence in this comment is not fully correct, the 2015 criteria for bifenthrin ,lambda cyhalothrin, cyfluthrin, and ensfenvalerate developed by the Central Valley Water Board staff are based on the 1st percentile, but their 2015 criteria for permethrin is based on the 5th percentile.</p> <p>The 2010 UC Davis criteria for bifenthrin and lambda cyhalothrin are based on the 5th percentile, the 2010 UC Davis criteria for cyfluthrin is based on the 1st percentile.</p> <p>Additionally, see staff response to comment number 2.10.</p>
2.10	Ms. Dunham on behalf of	<p>First, whether it is the 1st or 5th percentile, there already exists considerable conservatism built into the UCD Methodology with the safety factors included within the</p>	<p>Staff Response: As stated in response to comment 2.9 above, staff does not find the criteria to be overly</p>

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	the PWG	derivation process. For example, a safety factor of 2 is applied in the derivation process.	conservative. Staff acknowledges that a factor of 2 is included in criteria calculations. The factor of 2 is used to calculate final acute criteria because LC50 data is used to calculate acute criteria and a LC50 is not a protective level. At a LC50 level only half the species survive. Dividing by a factor of 2 is intended to result in a concentration that will protect all species and meet the Basin Plan narrative toxicity objective of maintaining waters free of “toxic substances in concentrations that produce detrimental physiological responses in plant, animal, or aquatic life.” Using a factor of 2 is consistent with U.S. EPA’s 1985 criteria derivation guidelines.
2.11	Ms. Dunham on behalf of the PWG	Second, the 1st percentile approach looks to protect the most sensitive laboratory species rather than the most sensitive beneficial use. The water boards are charged with reasonably protecting the most sensitive beneficial use-not the most sensitive species.	<p>Staff Response: Staff assumes that Ms. Dunham is referring to aquatic species like <i>Hyalella azteca</i> in her comment as the “most sensitive species.” The California Water Code charges the Central Coast Water Board with reasonably protecting beneficial uses. Protecting beneficial uses includes protecting <i>Hyalella azteca</i>, an important organism to the food web. The Lower Salinas TMDL uses <i>Hyalella azteca</i>, which is an indicator species commonly used in toxicity testing. For clarification, the relevant sections of the California Water Code and Basin Plan are noted below:</p> <p>Section 13241, Division 7 of the California Water Code specifies: that each Regional Water Quality Control Board shall establish water quality objectives which, in the Regional Board's judgment, are necessary for the reasonable protection of beneficial uses and for the prevention of nuisance.</p> <p>The specific water quality objectives in the Basin Plan that form the basis of the Lower Salinas TMDL are as</p>

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			<p>follows:</p> <p><u>General Objective for Toxicity:</u> <i>All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in, human, plant, animal, or aquatic life. Compliance with the objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, toxicity bioassays of appropriate duration, or other appropriate methods.</i></p> <p><u>General Objective for Pesticides:</u> <i>No individual pesticide or combination of pesticides shall reach concentrations that adversely affect beneficial uses. There shall be no increase in pesticide concentrations found in bottom sediments or aquatic life.</i></p> <p>The toxicity water quality objective states that compliance can be determined by use of indicator organisms. The Lower Salinas TMDL uses the indicator species commonly used in toxicity testing (the anthropod, <i>Hyaella azteca</i>). <i>Hyaella azteca</i> is sensitive to pyrethroids, but is also representative of many types of invertebrates that inhabit aquatic ecosystems.</p>
2.12	Ms. Dunham on behalf of the PWG	Third, other available evidence suggests that the UCD criteria, and as updated in 2015, are overly conservative because the criteria derived are based on toxicity tests using sensitive laboratory <i>Hyaella azteca</i> , which do not necessarily reflect the native populations in California's water bodies.	<p>Staff Response: Utilizing the laboratory species of <i>Hyaella azteca</i> is not an overly conservative approach since native populations from undeveloped areas have been found to be as sensitive as laboratory species. A study by Dr. Donald Weston published in the Proceedings of the National Academy of Science (Weston et al., 2013) found that some native <i>Hyaella azteca</i> species have evolved and developed resistance</p>

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			to pyrethroids from regular exposure to the chemical in urban and agricultural areas. Utilizing <i>Hyaella azteca</i> that have developed resistance to pyrethroids would not be protective of beneficial uses. Dr. Weston's study reported that wild populations collected from undeveloped areas with few pesticide inputs were equally sensitive to pyrethroids as laboratory cultures and these sensitive populations did not have the genetic mutations seen in the resistant populations.
2.13	Ms. Dunham on behalf of the PWG	<p>The Central Valley Water Board ultimately determined it appropriate for the Central Valley Water Board to use 5th percentiles from the UCD updated criteria in 2015 as concentration goals to develop criteria-normalized concentration units that are then incorporated into acute and chronic additivity equations. The PWG found this approach to be reasonable within the Central Valley Pyrethroid Amendment because <i>goals-not</i> water quality objectives or values-are being used to interpret narrative water quality objectives.</p> <p>In contrast, the Central Coast Water Board looks to use the UCD criteria as numeric targets in their proposed Basin Plan Amendments. The numeric targets are described as being "interpretations of the Basin Plan narrative objective for pesticides" The same targets are also described in the Board's resolution as being "existing concentration-based water quality objectives" As discussed further below, how these very conservative criteria are characterized and used by the two regional difference boards is significant. It is this that causes the PWG to have concerns with the Central Coast Water Board's approach.</p>	<p>Staff Response: The Central Valley Water Board and the Central Coast Water Board use the UC Davis criteria differently. The Central Valley Water Board use the criteria for both concentration goals and TMDL numeric targets, the Central Coast Water Board only use the criteria for TMDL targets. However, both regions have similar TMDL approaches. Both regions use water concentration based criteria as pyrethroid TMDL targets and use sediment toxicity tests with the test organism, <i>Hyaella azteca</i>, as targets. The water concentration based criteria and the sediment toxicity tests were also used as targets in the earlier Santa Maria TMDL. The Central Valley Water Board Basin Plan amendment includes TMDLs with numeric water concentration targets based on the UC Davis criteria for nine urban waterbody segments on the 303(d) List as impaired for pyrethroids.</p> <p>Ms. Dunham states that the numeric targets are described as both "interpretations of the Basin Plan narrative objectives for pesticides" and as being "existing concentration based water quality objectives." The pesticide numeric targets in the Lower Salinas TMDL are interpretations of the Basin Plan narrative</p>

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			objectives for pesticides, but are not themselves water quality objectives. Therefore, the Central Coast Water Board resolution (Finding 13) for the Lower Salinas River TMDL that says "... existing concentration based water quality objectives...." is not stating that the UC Davis criteria is being used as water quality objectives in this TMDL. The resolution is describing the broader regulatory authority of the Water Boards to develop concentration-based targets in part because, in a broad context, existing concentration-based water quality objectives can be used for TMDL targets. The Central Coast Water Board affirms this authority in the Lower Salinas TMDL resolution.
2.14	Ms. Dunham on behalf of the PWG	<p>III. Central Coast Water Board Should Use UCD Criteria as Triggers Rather Than Numeric Targets</p> <p>As indicated above, the Central Coast Water Board uses the UCD criteria as numeric targets to interpret a narrative water quality objective. Ironically, the Central Coast Water Board's Technical Project Report alleges that its basis for evaluating published numeric criteria to interpret a narrative water quality objective comes from a policy that is within the Central Valley Water Board's Basin Plan-not the Central Coast Water Board Basin Plan.</p> <p style="padding-left: 40px;">The basis of this evaluation is the Central Valley Regional Water Quality Control Board's Policy for Application of Water Quality Objectives that states the board will consider 'relevant numerical criteria and guidelines developed and/or published by other agencies and organizations.</p> <p>Putting aside the fact that the Central Coast Water Board does not have such a policy for interpreting narrative objectives with available criteria in its Basin Plan, it is</p>	<p>Staff Response: Ms. Dunham questions the use of a Central Valley Water Board policy by the Central Coast Water Board to support development of numeric targets for narrative water quality objectives. The development of TMDL numeric targets for narrative objectives is a requirement of the Clean Water Act, which states the following:</p> <p><i>The TMDL document describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative objectives, and antidegradation policies. Numeric water quality target(s) for TMDL must be identified, and an adequate basis for target(s) as interpretation of water quality standards must be specifically documented in the submittal. [40 CFR 130.7(c)(1)]</i></p> <p>Ms. Dunham is incorrect in stating that the Central Valley Water Board determined that information was insufficient to interpret narrative objectives. The</p>

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		<p>inappropriate to use the UCD criteria in this manner for all of the reasons expressed in the Central Valley Pyrethroid Amendment, which is why the Central Valley Water Board has adopted a different approach. Most significantly, the Central Valley Water Board is adopting triggers because it found that there is inadequate available data and information to use the UCD criteria as water quality objectives or to interpret narrative objectives. The Central Valley Water Board reached this conclusion after holding numerous stakeholder meetings, workshops before the Central Valley Water Board, and after careful consideration of numerous factors. In contrast, the Central Coast Water Board proposes to use the UCD criteria without having the same level of process or discussion associated with these criteria.</p> <p>To avoid inconsistent policies throughout the state, the PWG recommends that the State Water Board direct the Central Coast Water Board to eliminate use of the UCD criteria as numeric targets and instead consider how they could be used as triggers rather than as criteria to interpret narrative water quality objectives.</p>	<p>Central Valley Water Board did just that in establishing TMDLs, which utilized the UC Davis criteria in the numeric target, as described in responses to comment Item 2.4.</p> <p>Ms. Dunham requests the Central Coast Water Board develop pyrethroid triggers instead of targets. Staff evaluated the Central Valley Water Board's approach of using triggers and determined the approach was not appropriate at this time for the lower Salinas River watershed. Ms. Dunham recommends triggers when there is inadequate data and information. The approach of developing triggers is unnecessary in the lower Salinas River watershed given the extensive amount of monitoring that has already occurred and the amount of toxicity present. For the lower Salinas River TMDL, 159 sediment samples were analyzed and 70% were toxic. Analysis for the TMDL and several special studies link the sediment toxicity to concentrations of pyrethroids in the sediment. With the water quality problems identified, programs can move forward with implementation of the TMDLs without the need to step back and establish triggers.</p> <p>Ms. Dunham further states that Central Coast Water Board should engage in a similar stakeholder process to the one held by the Central Valley Water Board to consider adopting triggers. The Central Coast Water Board had an extensive stakeholder process over 6 years to develop the lower Salinas River and Santa Maria TMDLs that is described in part in response to comment 2.19. Additionally, the UC Davis Criteria and pyrethroid reports underwent extensive public and scientific peer review that is documented on the</p>
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			criteria development website.
2.15	Ms. Dunham on behalf of the PWG	<p>IV. Central Coast Water Board Should Use Freely Dissolved (i.e., Bioavailable) Pyrethroid Concentrations</p> <p>Regardless of the UCD criteria being used as numeric targets or triggers, such criteria represent the bioavailable fraction. Although the Lower Salinas TMDL includes a recommendation for use of freely dissolved concentrations as it relates to water quality targets, this accommodation fails to accurately capture the true nature of pyrethroids. Use of freely dissolved concentrations is an essential consideration, given that pyrethroids are highly hydrophobic and bind tightly to suspended solids and organic matter, and it is the freely dissolved (and hence bioavailable) fraction of the chemical that is available for adsorption through the gills and skin of aquatic organisms (i.e., the portion not bound to solids and organic matter). Use of the freely dissolved concentration (calculated using the best-available science adsorption coefficients) is an appropriate predictor of bioavailability for pyrethroids because it is highly correlated with the bioavailable fraction. However, rather than making an affirmative statement, the Lower Salinas TMDL states that "staff supports environmental managers' choosing the appropriate assessment method and recognizes there are situations in which whole water samples may be an appropriate assessment method."</p> <p>The reference to "environmental managers' choosing" is problematic in that the water quality targets are being set to determine compliance with the TMDL provisions. If the targets are based on criteria that represent freely dissolved concentrations, how is it proper for "environmental managers" to use whole water samples under any</p>	<p>Staff Response: As noted by Ms. Dunham, the Lower Salinas TMDL recommends that freely dissolved concentrations of pyrethroids in water be used for determination of compliance with water concentration numeric targets for pyrethroids. Ms. Dunham questions how it is proper for environmental managers to compare the whole water samples to targets based on the UC Davis criteria. The UC Davis criteria specifically states that freely dissolved concentration is recommended for determination of compliance but environmental managers should have the discretion to use whole water samples and the TMDL is consistent with this recommendation. The basis of the UC Davis recommendation is the potential for pyrethroids bound to sediment to still cause toxicity. For example, pyrethroids bound to sediment may desorb when digested and become toxic to an organism.</p> <p>The use of whole water samples is appropriate in various scenarios. For example, the Central Coast Water Board determined that waterbodies are impaired for pyrethroids in the Santa Maria TMDL using whole water samples. In the Santa Maria situation, the concentration of pyrethroids in the whole water samples greatly exceeded the criteria. Additionally, many of the samples exceeded U.S. EPA benchmarks for pyrethroids. Furthermore, sediment toxicity data indicated the waterbodies were toxic to invertebrates that are sensitive to pyrethroids. Ms. Dunham and the PWG challenged the findings of the Santa Maria TMDL in court, and the trial court upheld the Santa Maria TMDL. The court's decision also specifically supported</p>

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		<p>circumstance? Use of whole water samples will not properly determine if TMDL compliance has been achieved.</p>	<p>the use of whole water samples by the Central Coast Water Board.</p> <p>During TMDL implementation, if a whole water sample greatly exceeds the criteria, determining the bioavailable fraction would be an unnecessary step. However, if a whole water sample is found to be less toxic (closer to the criteria), calculation of the freely dissolved concentration may be appropriate.</p>
2.16	Ms. Dunham on behalf of the PWG	<p>V. Central Coast Water Board Response to Certain Comments Failed to Consider Actual Ecological Impacts and Failed to Consider Data and Information Submitted by the PWG</p> <p>The PWG provided data and information prepared by Dr. Lenwood Hall that pertained directly to the lower Salinas watershed. In response to this data and information, Central Coast Water Board staff made summary conclusions that this data further supported their findings in the Lower Salinas TMDL. We disagree with their summary conclusions and depiction of the data and information contained in Dr. Hall's report.</p>	<p>Staff Response: See staff responses to comments 2.17 and 2.18.</p>
2.17	Ms. Dunham on behalf of the PWG	<p>Specifically, the Response to Comments states that sediment concentrations of pyrethroids are toxic in Salinas streams. However, the Response fails to mention important details surrounding this statement based on ecological relevance and actual impacts on designated uses (resident benthic communities). Dr. Hall's field research in Salinas streams showed that sediment samples collected in 2011 had a sum of pyrethroid Toxic Units (TUs) greater than 1 at various sites based on using toxicity data from a highly sensitive laboratory-reared</p>	<p>Staff Response: Staff disagrees with Ms. Dunham's conclusion that the toxicity unit (TU) evaluation approach should only be considered a screening level approach and that the results of Dr. Hall's study do not mean the actual sediments are toxic. The Salinas River TMDL documents extensive sediment toxicity to <i>Hyalella azteca</i> at monitoring sites in the stream reaches studied by Dr. Hall. Dr. Hall's TU analysis are also based on <i>Hyalella</i> toxicity levels; therefore, the</p>

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		species (<i>Hyalella</i>) in the denominator of the TU equation (environmental concentration/toxicity value of most sensitive species). This TU approach, using a highly sensitive species, should be considered a screening level approach, and does not mean that actual sediment concentrations of pyrethroids are impacting in-stream benthic communities.	results are comparable. Dr. Halls monitoring found 19 of 24 or 80% of his samples to have greater than 1 TU. Refer to Table 1 for a summary of Dr. Hall's monitoring results. His data are consistent with the findings of the TMDL, which found 100% sediment toxicity in TMDL watershed samples and supports development of pyrethroid TMDLs for these waterbodies.
2.18	Ms. Dunham on behalf of the PWG	<p>The best approach for determining if resident benthic communities are actually impacted is through a bioassessment multiple-stressor field study that includes pyrethroids. A multiple-year bioassessment multiple-stressor field study was conducted in the same Salinas streams addressed in this TMDL (Hall et al. 2013b). This study was specifically designed to determine the relationship of benthic community metrics to physical habitat, pyrethroids and metals. The key conclusion from this study is that physical habitat (specifically sediment deposition) was the most important factor shaping benthic communities in these Salinas streams (Hall et al 2013b). Pyrethroids were not reported to have a significant relationship with benthic community metrics in these Salinas streams. Therefore, actual field data addressing pyrethroid impacts along with other real world stressors on resident benthic communities would not support the need for TMDLs for pyrethroids in the Salinas streams.</p> <p>Further, in response to comments regarding the need to consider ecosystem impacts, Central Coast Water Board staff merely noted that biological indicators are an important tool for evaluating impacts to beneficial uses, but that staff was not able to evaluate them for this TMDL project. However, Central Coast Water Board staff failed to explain why they were unable to consider this information for the TMDL project even though it was provided to</p>	<p>Staff Response: Staff concurs on the importance of biological assessments. However, waterbodies in the lower Salinas River watershed are identified as impaired for sediment toxicity and the sediment toxicity is linked to pyrethroid pesticides. The lower Salinas River TMDL was developed to address these impairments.</p> <p>Ms. Dunham is concerned that staff did not fully consider her comments and Dr. Hall's work regarding ecosystem impacts. Staff reviewed Dr. Hall's work closely along with other studies on macroinvertebrate stressors.</p> <p>Dr. Hall's work and the work of others concludes that the physical habitat of streams and sediment deposition are important factors on the health of benthic communities (Carlisle et al., 2013). Ms. Dunham states that the work from Dr. Hall "pertains to the lower Salinas watershed." It is important to note that Dr. Hall's studies focus on a limited and highly physically impacted section of the lower Salinas River watershed within the City of Salinas. Conclusions from this study area may not be applicable to the entire watershed. Staff mapped Dr. Halls monitoring sites (please refer to Figures 1 through 3). These stream reaches are only representative of highly modified urban and agricultural</p>

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		<p>them during the written public comment period. As indicated, the bioassessment data are available from a multiple- year /multiple-stressor study (including pyrethroids) in the Salinas watershed and would seem to be the best data available to use for the TMDL process in place of screening level data from single-species laboratory toxicity tests (Hall et al. 2013b). Moreover, submittal of data and information during the written public comment period is intended to inform the Water Board's proposed regulatory action. If such information is to be ignored for whatever reason, it undermines the intent and purpose of the public comment process.</p>	<p>drainages and do not represent more ecologically critical waters particularly near the coast and in the uplands. His study also fully excludes the main stem Salinas River and the Salinas River Estuary. The Salinas River is the major stream in the watershed and the Salinas River estuary is habitat to critical species.</p> <p>The area specifically studied by Dr. Hall is referred to as the Reclamation Canal subwatershed. The main channel was constructed in the early 1900s to drain sloughs and lakebeds in and around the city for farming and development. An historical ecology wetland assessment of the watershed is included in the lower Salinas River TMDL technical report that describes this area. Many of his monitoring sites are located in a historic lakebed referred to as Carr Lake. Given the limited geographic scope and ecological variability of Dr. Hall's research, staff concludes that it should not be used to diminish the need for TMDLs. In addition, other research has been conducted on other more ecologically significant areas of the Salinas River watershed, such as the Salinas River and it was found that pesticides are the primary stressor impacting macroinvertebrates (Anderson et al., 2006).</p> <p>Ms. Dunham states that Dr. Hall's study supports the conclusion that actual field data addressing pyrethroid impacts, along with other real world stressors, on resident benthic communities would not support the need for TMDLs for pyrethroids in the Salinas streams. Dr. Hall concludes in his study that resident populations of macroinvertebrates are not significantly impacted by pyrethroids because the populations were similar in both depositional and non-depositional areas</p>
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			in his study area. This conclusion is based on higher concentrations of pyrethroids in the depositional areas than in non-depositional areas (refer to Table 1). Staff questions this conclusion since the majority of non-depositional samples are toxic; that is, higher than 1 TU (refer to Table 1).
2.19	Ms. Dunham on behalf of the PWG	<p>VI. Central Coast Water Board Should Be Directed to Follow the Central Valley Water Board Approach</p> <p>Although the PWG finds the Central Valley Water Board's 2015 criteria, as well as the UCD 2010 criteria, to be overly conservative with respect to the development of the Central Valley Water Board's Pyrethroid Amendment as a whole, the Central Valley Water Board conducted an open, fair and transparent process that spanned many years. Stakeholder meetings were scheduled and noticed for all interested persons, and all stakeholders were given multiple opportunities to comment on administrative draft versions of proposed amendments. Central Valley Water Board staff were open to varying viewpoints and considered data and information provided by all stakeholders. Overall, the PWG believes that this process led to the development of a scientifically robust and reasonable Basin Plan amendment.</p> <p>In contrast, the Central Coast Water Board conducted a few public workshops, prepared a staff report and amendments that were released for public comment, and more than a year after closing the written comment period, held a public hearing for adoption. Further, data and information submitted during the comment process appear to have been dismissed without actual consideration. In light of these deficiencies, and lack of consideration of the</p>	<p>Staff Response: The Central Coast Water Board process was extensive, fair and transparent, including 3 years of process on this TMDL (plus 3 years of process on a previous, almost identical TMDL, for a total of over 6 years of work with the same stakeholders on these issues). The Central Coast Water Board conducted extensive public outreach for the Lower Salinas TMDL and went to great lengths to address stakeholder concerns. Staff conducted numerous public stakeholders meetings and made all documents available to the public. In addition to standard TMDL outreach, staff made a concerted effort to conduct outreach with the agricultural community, which is highly reliant on pyrethroids for crop production. For example, staff met with the Grower Shipper Association's pesticide and water committees and participated in a pyrethroid/water quality forum sponsored by UC Extension in Salinas. The Grower Shipper Association specifically acknowledged the outreach efforts by staff in a comment letter to the Central Coast Water Board.</p> <p>The process for the lower Salinas TMDL built upon a similarly lengthy and extensive public and scientific process conducted for the Santa Maria TMDL. Many concerns were heard and addressed during the Santa Maria TMDL process. Doing so helped alleviate concerns amongst the municipalities in the lower</p>

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		<p>Central Valley Water Board's action as actually directed by the State Water Board, the PWG believes it appropriate for the State Water Board to reject the Lower Salinas TMDL. In its rejection of the TMDL, the State Water Board should provide clear direction to the Central Coast Water Board regarding changes it should make with respect to addressing pyrethroid pesticides.</p>	<p>Salinas River watershed.</p> <p>As noted by Ms. Dunham, adoption by the Central Coast Water Board of the lower Salinas TMDL was delayed by over a year after the close of the initial adoption hearing in May 2016. After this initial adoption hearing, staff did continue to conduct extensive public outreach. Staff documented these efforts in the July 2017 staff report for the Central Coast Water Board adoption hearing.</p> <p>Additionally, see staff response to comment number 2.8.</p>
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Table 1. Pyrethroid sediment toxicity units from the study by Dr. Hall.

<i>Sample ID</i>	<i>% TOC</i>	<i>Bifen TU</i>	<i>Fen TU</i>	<i>Lam-cy TU</i>	<i>Perm TU</i>	<i>Cyflu TU</i>	<i>Cyper TU</i>	<i>Esfen TU</i>	<i>Delta TU</i>	<i>Sum TU</i>
MC186D	1.960	0.33	NA	0.25	0.11	0.03	0.71	0.03	0.34	1.8
MC462ND	1.895	0.27	NA	0.14	0.06	0.03	0.31	0.01	0.13	0.95
MC1459ND	1.625	0.58	NA	0.29	0.15	0.05	0.58	0.03	0.06	1.74
MC1874D	2.005	0.73	NA	0.37	0.17	0.08	0.80	0.04	0.03	2.22
MC1975D	2.290	0.48	NA	0.26	0.13	0.05	0.62	0.02	0.05	1.61
*MC2994ND	1.695	1.71	NA	0.70	0.59	0.03	1.32	0.08	0.10	4.53
GC1567D	2.730	0.65	NA	0.13	0.05	0.07	0.17	0.006	0	1.08
GC1585D	2.985	0.55	NA	0.17	0.05	0.02	0.14	0.005	0.01	0.95
GC1629ND	0.212	0.20	NA	0.08	0.02	0.008	0.04	0.003	0	0.35
GC2424D	3.825	0.76	NA	0.27	0.07	0.02	0.22	0.007	0.01	1.36
GC2485ND	0.332	0.12	NA	0.05	0.01	0.006	0.03	0.001	0	0.22
GC2974ND	0.123	0.64	NA	0.38	0.07	0.02	0.18	0.007	0	1.3
NC1778ND	0.663	0.34	NA	0.06	0.02	0.02	0.13	0.005	0	0.58
NC2271D	1.355	2.7	NA	0.35	0.08	0.16	0.36	0.01	0.09	3.75
NC2342ND	0.405	0.74	NA	0.11	0.02	0.02	0.11	0.005	0.12	1.13
NC2856D	1.760	3.27	NA	0.38	0.21	0.15	0.55	0.06	0.25	4.87
NC2978ND	0.488	0.80	NA	0.16	0.06	0.03	0.18	0.008	0.10	1.34
NC3799D	1.860	1.49	NA	7.0	17.6	0.04	0.74	0.003	0.01	26.9
AC2117D	2.125	1.77	NA	2.01	0.91	0.11	6.26	0.16	0.04	11.26
AC2380ND	0.222	0.93	NA	1.09	0.21	0.03	1.41	0.04	0	3.71
AC2988ND	0.255	0.79	NA	0.66	0.16	0.06	1.26	0.07	0	3
AC3852D	2.190	1.56	NA	2.32	0.42	0.05	4.77	0.14	0	9.26
AC4544D	1.360	1.71	NA	2.26	0.52	0.06	4	0.12	0.02	8.69
AC4828ND	0.660	0.77	NA	1.34	0.24	0.03	2.17	0.08	0	4.63

Depositional (D) and Non-Depositional (ND) samples are noted in the sample ID column. The sum of TUs by site is also included. Toxic Units > 1.0 are in bold type.

*This site is a depositional area based on grain size analysis.

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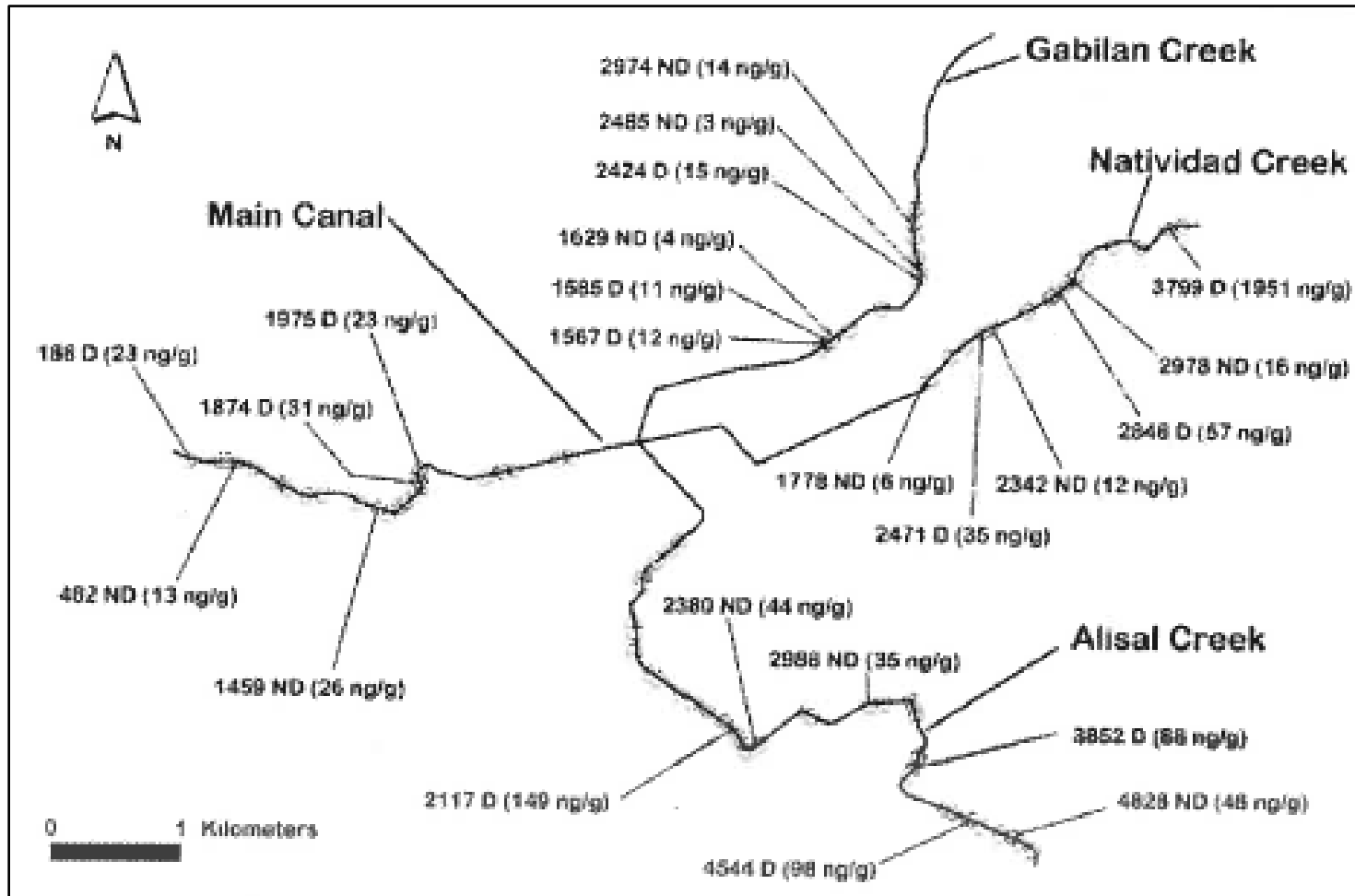
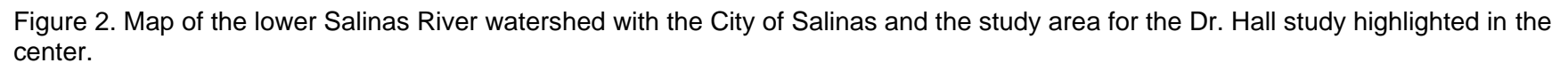


Figure 1. Map of Dr. Hall's study area in the lower Salinas River Watershed and monitoring sites. Site samples identified as "ND" are non-depositional areas and site with "D" are depositional areas. Total pyrethroid concentrations in parenthesis.

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Comment Summary and Responses
Comment Deadline: October 30, 2017

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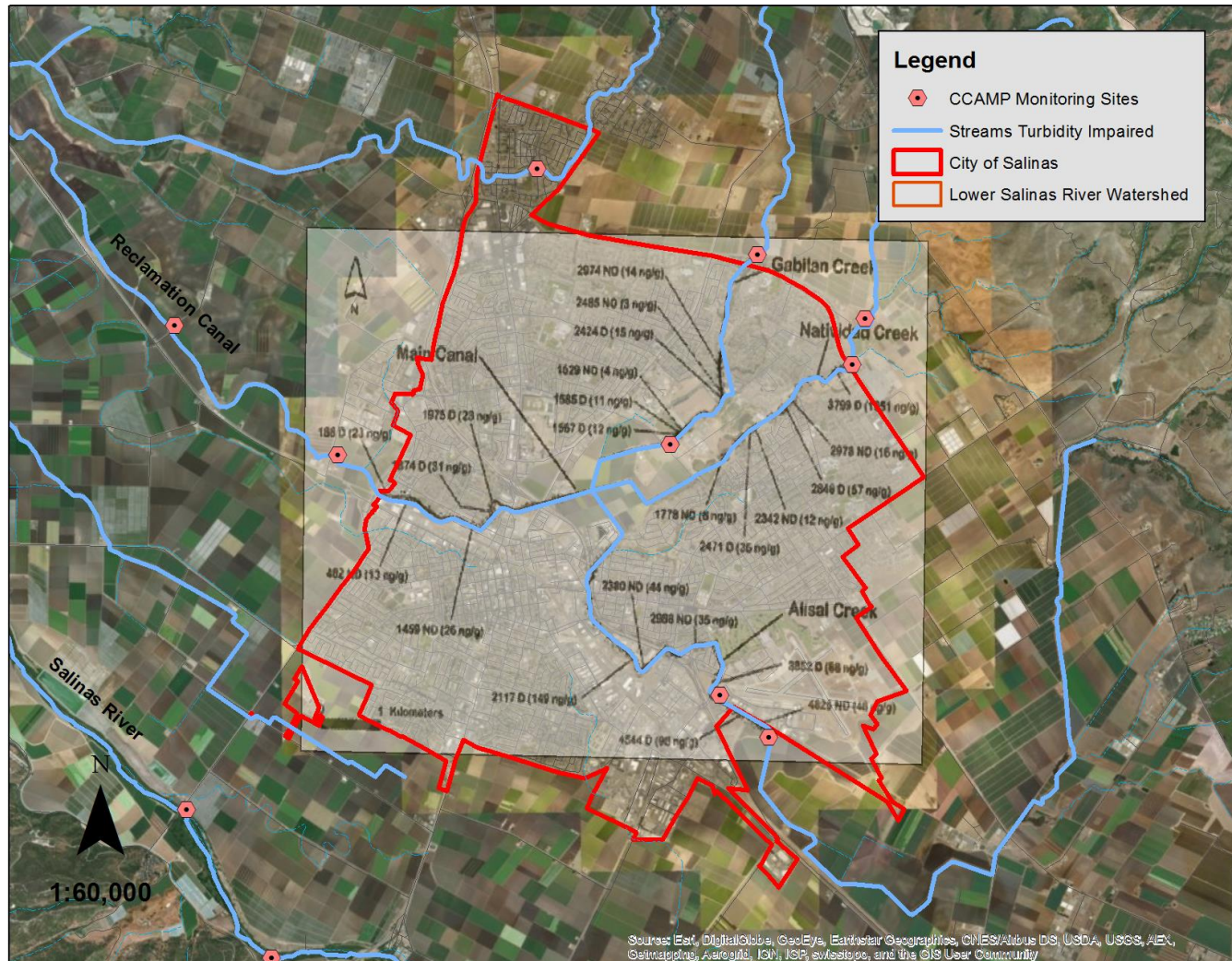


Figure 3. Enlarged map of the City of Salinas with an overlay of the map of Dr. Hall's monitoring sites. His sites are within the city limits.